

At that meeting it was agreed that the Department would undertake an educational campaign the following spring to encourage cautious use of insecticides and protection of bees.

With the cooperation of Kanawha and Putnam county extension agents, 9,000 "Save the Bees" inserts were included in the garden calendars distributed in those counties in the third and fourth quarters. Additional flyers were distributed by members of the Kanawha Valley Beekeepers Association and State Apiarist. At the request of the KVBA, local newspapers and television carried articles and public service messages on the "Save the Bees" theme. Whether or not as a result of this publicity, reports of insecticide damage to bees in the Kanawha Valley were scarce in the fourth quarter (spring). Scattered reports of insecticide kills have been received from the northeastern part of the state.

Miscellaneous

The Crop and Livestock Reporting Service annual survey of honey producers showed production in 1984 to be only 880,000 pounds, about equal to the previous year's total, which was the poorest on record. Although production was impressive in the spring of 1984, distinguished by a flow of rare locust honey, flows ceased in the first quarter (summer) and many colonies consumed most or all of what would have been surplus honey.

COOPERATIVE FOREST PEST ACTION PROGRAM

During FY 1985, the insect receiving the most attention was the gypsy moth. Other native insects caused little damage or concern to residents of West Virginia.

The first defoliation by gypsy moth was recorded in West Virginia during June, 1985. Approximately 2,400 acres of hardwoods were defoliated.

Additional mortality to oaks was noticed and recorded in the eastern panhandle where the looper populations were abundant in 1981 through 1983. Research plots were established in the areas by the West Virginia University School of Forestry in cooperation with USFS. The study plots are designed to monitor the mortality that occurred from defoliation by the loopers. The most recent research data shows that 50% of the basal area of oaks has been lost in the areas defoliated by the loopers. The looper populations have collapsed (Spring of 1984) in the eastern panhandle. Additional areas in the mountainous areas of West Virginia (Randolph County) have populations of looper (mainly fall cankerworm) but they were not as abundant as surveys had indicated. It is believed the insect's population may have been reduced because of the late freezes in the spring of 1985.

Surveys were conducted for various native insects and the findings are: The eastern tent caterpillar which normally exists

throughout West Virginia and causes much concern with urban dwellers has been on the decline and is now practically non-existent in most of West Virginia. The only areas noted as having the eastern tent caterpillar were Monongalia County and the Greenbrier Valley. All nests examined in early spring were found to have the naturally occurring polyhedrosis virus. This in no way means that we will not have high populations again in coming years. This will happen and will again decline.

The locust leaf miner was prevalent throughout the central, northern and eastern sections of West Virginia. Feeding by this insect on black locust was heavy and brown leaves caused by the feeding could be observed throughout these areas. High populations of this insect have subsided in southern West Virginia and few trees were affected.

The fall webworm, which forms nests or webs in trees during late summer or early fall, was abundant throughout the state. The northern panhandle experienced the heaviest outbreak.

The tuliptree scale, which was a statewide problem throughout West Virginia in 1982-1984, collapsed in the early summer of 1984. Plans to inject selected trees with Orthene were abandoned due to the collapse of the insect. Numerous trees still have the symptoms of the scale attack and are stunted and have dead branches.

The yellow poplar leaf-mining weevil was detected throughout West Virginia on yellow poplar in the spring of 1985. The damage caused by this insect will not be evident until mid to late summer of 1985.

One of the more economically important insects to affect lumber and logs was the ambrosia beetle. This insect was found in log decks of several sawmills and recommendations for control were given. The insect had not caused any great damage when detected and treatment was applied in time to prevent extensive damage to logs or lumber. The infestations will be monitored throughout 1985-1986 and recommendations will be made when necessary.

The program leader, Alan R. Miller, was elected to serve on the National Gypsy Moth Management Board executive committee and was named chairman of the Protection Committee of the Society of American Foresters, West Virginia Chapter. He was also named co-membership chairman of the Agriculture and Forestry Alumni Association of West Virginia University.

The National Annual Gypsy Moth Review was hosted by the West Virginia Department of Agriculture, Plant Pest Control Division, with Alan R. Miller as program chairman and in charge of local arrangements. The meeting was attended by approximately 210 persons from throughout the USA and several foreign countries.

Four full time-part time personnel continued to work on the gypsy moth and blister rust programs. These men will continue to be employed as long as funds are available for these activities.

The annual Forest Insect and Disease Calendar, which is in great demand from cooperators, was prepared and mailed. The wall calendar is supplemented with a pocket secretary and billfold size calendar. All depict forest insects and diseases that occur in West Virginia. The Bottom section of the wall calendar (days) contains timely information on detecting or treating various insects or diseases. It also gives a timetable for the reporting of accomplishments (quarterly reports, annual reports, etc.).

A quarterly newsletter that provides timely information on forest insects and diseases is sent to cooperators and other concerned individuals.

Numerous talks and programs were presented throughout the year and include: radio talks with Doug Hudson on a scheduled basis; TV shows; talks with garden clubs, women's clubs, schools, civic organizations, etc.

Tours and camps are arranged and attended. These are: Camps - Forest Industries Camp, Conservation Camp, National 4-H Forestry Invitational, State 4-H Forestry Competition; Tours: Each year, Webster County Nature Tour and the Annual Wildflower Pilgrimage at Blackwater Falls State Park. Other tours were conducted for various groups which would include scouts, garden clubs and schools.

The Mountain State Forest Festival was attended and a display dealing with forest insects and diseases was set up and manned by Plant Pest Control personnel.

The proceedings of the Annual Gypsy Moth Review were compiled by Alan R. Miller and printed by the Information Division and sent to participants.

Public meetings to address the Gypsy Moth Program were held March 27 and 29, 1985, at Keyser and Cacapon State Park, respectively. These meetings were designed to hear the issues or concerns that land owners may have on the program. None were received. The greatest concern of landowners was making sure their land would be treated. If not selected for treatment they wanted to know why.

Gypsy Moth General Detection

The gypsy moth project accounted for more hours this fiscal year than all other pest problems combined. Three employees have been working full time on monitoring treatment areas, conducting egg mass surveys, gathering information on parasites, banding trees, and general detection for larvae, pupal cases and egg masses.

The trapping program for male moths was hampered by limited funds. A grid system of trapping was maintained in the east central counties. Additional traps were placed throughout the state on a random basis. The counties with male moth catches were: Barbour 21, Brooke 85, Hancock 17, Harrison 1, Marion 11, Marshall 18, Monongalia 6, Ohio 53, Preston 355,

Taylor 5, Tucker 6, Pendleton 5, Pocahontas 1, Mercer 3, Summers 1, Roane 1, Wood 1, Greenbrier 1, Fayette 2 and Putnam 2. The eastern panhandle counties of Jefferson, Berkeley, Morgan, Hampshire, Mineral Grant and Hardy Counties are generally infested and no traps were placed.

Burlap bands on host trees were placed on a grid system throughout the eastern panhandle and areas were checked on daily and weekly intervals. New infestations were noted in Preston County near Glade Farms. Infestations were noted to be on the increase in the generally infested counties of the eastern panhandle and treatment was proposed for 55,000 acres of forest land in Morgan, Hampshire and Mineral Counties. The areas treated in the spring of 1984 were monitored for the success or failure of treatment. All areas treated had a reduction of gypsy moth caterpillars and egg mass counts showed a reduction of 90*%.

The areas treated in the spring of 1985 show a reduction in gypsy moth caterpillars but cannot be accurately measured until egg mass counts are completed in the fall of 1985.

The gypsy moth caused heavy defoliation to approximately 2,400 acres of forest land in the eastern panhandle counties during June of 1985. The areas defoliated were in Berkeley, Morgan and Hampshire Counties. The major defoliation took place on North Mountain in Berkeley County, south of Route 45. This area has never been treated, but will be monitored for possible treatment in 1986. The defoliation recorded in Morgan County was approximately 100 acres and in Hampshire County approximately 30 acres. The area in Morgan County that was defoliated occurred in the treatment blocks. However, when the areas were checked for gypsy moth caterpillars, no live larvae could be found. It is thought the areas were treated at a time when the larvae were in the fourth instar and the caterpillars were able to feed and cause defoliation before the growth regulator, Dimilin, took effect. These areas will be monitored for egg masses in the fall of 1985 to see if an infestation exists.

Gypsy Moth Treatment

The treatment plans for gypsy moth started in early fall and approximately 55,000 acres of forest land in Morgan, Hampshire and Berkeley Counties were selected for treatment.

The actual program began with two public meetings being held in the affected areas. No objections to the proposed program were voiced either in person or by writing. The only concern voiced by citizens attending the meetings was that their areas were not included in the proposed plan.

The bid for an aerial applicator was rewritten with more stringent rules and specifications. The contract was late in being awarded and will be much earlier in 1986.

The actual treatment took place from May 6 through the 10th and 54,020 acres of forested land was treated. For a detailed report of this project, the records are available through Plant Pest Control Division. Generally, the program started with calibration of aircraft on May 6, 1985 at Hancock airport. High winds prevented any treatment on May 7, 1985. The first treatment took place on May 8, 1985 and continued until May 9 at noon, when all of Morgan County was treated. The entire operation then moved to Cumberland Municipal Airport and treatment resumed on May 10, on which day the areas in Mineral and Hampshire Counties were treated and the operation was completed at 7:00 P.M. on May 10th.

The actual acres treated was 15,952 on May 8, 14,463 acres on May 9, and 23,605 acres on May 10.

All areas, except a 1,000 acre block, were treated with Dimilin at the rate of .03 pounds active ingredient per acre in total volume of one gallon of water to the acre. The 1,000 acre block was treated with Dimilin at .015 pounds active ingredient per acre.

Several different formulations of Dimilin were applied to different areas of forested land. All formulations were applied at the rate of .03 pounds aia in a total volume of one gallon per acre as follows: 900 acres treated with an aqueous Dimilin; 279 acres with an oil Dimilin in superior oil; and 484 acres with an oil Dimilin in water.

Additionally, 450 acres of the total 54,020 acres were treated in a research project involving wildlife, invertebrates, vertebrates. These three 150 acre blocks did not have gypsy moth egg masses and were designed to monitor the effect of Dimilin on wildlife in the area. This project was in cooperation with West Virginia University Forestry School, Division of Wildlife.

The success of the treatment program will be evaluated when egg mass counts are conducted in the fall of 1985.

Oak Wilt

Aerial flights were conducted over a 12 county area in 1984 to detect the presence of oak wilt. All suspect trees were plotted on topographic maps and ground personnel checked or sampled suspect trees for oak wilt disease. No positive trees were found in 1984 in the 12 county area.

Additionally, 16 quadrangles are flown in southwestern West Virginia and 18 quadrangles are flown in the eastern panhandle. These areas are flown to monitor the status of oak wilt disease. If the areas showed a dramatic increase they would be checked for possible new vector of oak wilt. All areas checked showed no great increase or decrease in Oak Wilt disease.

FOREST PATHOLOGY SECTION

Hardwood Diseases

One of the more serious shade tree problems to occur in the western

portion of West Virginia was bacterial canker. This disease was observed primarily on white oak trees but has been observed on chestnut oak and red oak. Samples of the bacterial ooze were collected at various locations in Kanawha County and submitted to Dr. W. L. MacDonald at WVU for analysis. Efforts are being made to identify the causal bacterium. Unfortunately, little or no research has been conducted on this topic. From observations, it has been concluded that stress inducing agents have played a great role in the infection process.

Beech bark disease continues to be a serious forest tree disease problem in Randolph and Pocahontas Counties. The disease is known to occur over 100,000 acres of forest timberland. Collections of Nectria sp. have revealed that the beech bark disease fungus Nectria coccinea var. faginata has become much more common. Several years ago only Nectria galligena could be isolated from symptomatic trees. Because beech bark disease does occur in West Virginia, reports of dying beech in other sections of the state are always investigated. Although beech trees were dying at sites in Greenbrier and Kanawha County, the forest pathologist was unable to find the beech scale insect or any other evidence of beech bark disease. The suspect trees had been damaged during logging, exhibited fire scars and had suffered extensive decay.

At the request of Assistant State Forester Al Allison and Forest Geneticist Frank Cech, an investigation was conducted at the yellow poplar seed orchard near Pt. Pleasant to determine what was causing seed tree mortality. Fusarium canker, Irpex canker and the yellow poplar borer insect were found to be quite common in the stand. Since an insect, the yellow poplar borer, was associated with the mortality, Dr. Charles Coffman, entomologist, became involved in the study.

Elm phloem necrosis, a disease reported in Charleston during the 1940's and not reported again until 1983, was observed again in 1984. Three symptomatic trees were observed in the Sissonville area of Charleston. Dr. W. L. MacDonald of WVU and Dr. R. J. Stipes of VPI & SU visited the Charleston area to investigate the disease problem. Samples were collected and photographs taken so that we could document the fact that elm phloem necrosis still occurs in West Virginia.

Oak decline has been reported throughout the state. This disease is primarily stress related. Typically, drought and insect defoliation severely stress a tree. After one or more years of stress, secondary insect and disease organisms then attack the tree. Typically, the two-lined chestnut borer and the Armillaria root rot organism are associated with the oak decline syndrome.

Although oak wilt is generally considered a forest tree disease, in some sections of the state urban trees are also lost. During the past fiscal year, at least two pin oaks in the Kanawha City section of Charleston succumbed to this disease. The first tree died in 1984 with a nearby root grafted tree dying in 1985.

One of the most serious maladies of maple is Verticillium wilt. During the past fiscal year there have been numerous reports of urban maple trees succumbing to this disease. All species of maples are susceptible. Verticillium wilt caused by the fungus Verticillium dahliae has become common enough in the Charleston area that sugar and Norway maples are no longer recommended as a first choice when people are considering replacement trees.

Conifer Diseases

Preliminary surveys were conducted in red spruce stands on the Monongahela National Forest to investigate red spruce mortality. Insects associated with the declining trees were collected. In addition, fungal conks were collected from dead and dying trees for identification. The branch canker fungus Cytospora kunzei was isolated from the branches of declining red spruce on Spruce and Gaudineer Mountains.

Decline symptoms observed throughout the red spruce stands included the casting of older needles, extensive feeder root mortality and reduced growth rates. Trees on Spruce Knob and Gaudineer Knob died in small discrete pockets while other locations were affected over a more general area. Red spruce reproduction is abundant in healthy and declining stands throughout.

Just a few years ago the first incidence of Rhizosphaera needlecast was reported in West Virginia. This disease that attacks Norway and Colorado blue spruce has now been reported in many counties of the state. Until this year Rhizosphaera needlecase had only been reported on a few isolated trees. In Greenbrier County a single three acre Norway spruce Christmas tree planting was found to be heavily diseased. Although the trees in the planting were not killed, they were severely damaged. Fungicide recommendations were provided to individuals who had spruce trees with Rhizosphaera needlecast. Unfortunately, the fungicide of choice, Chlorothalonil, is difficult to find in many parts of West Virginia.

A Frazier fir branch tip mortality problem was reported by one Christmas tree grower in Randolph County. After viewing the plantation and talking with the manager, we decided that the new growth had been damaged in the spring by a frost or freeze. This was followed by the invasion of the new growth by a weakly pathogenic organism. This theory was supported by the fact that only Botrytis sp. could be isolated from the branch tips. Botrytis sp. is known to invade predisposed tissue. In Pennsylvania, a similar phenomenon was reported. However, there they were able to isolate the fungus Phomopsis sp. from the branch tips.

During the spring of 1985, a Scotch pine seedling displaying the symptoms of Lophodermium needlecast were submitted to the forest pathologist for positive identification. The seedlings, purchased from Musser's Forest this spring, were indeed infected with the Leptostroma stage of the Lophodermium fungus. The Leptostroma stage serves as the conidiomata. The grower was provided with the proper fungicide recommendations. In addition, the Pennsylvania Department of Agriculture was contacted regarding the movement of diseased seedlings.

A branch sample from a dying Japanese larch was submitted to the Pest Identification Laboratory by assistant district forester Jerry Atkins. The larch branch appeared cankered and was oozing pitch. No fungal fruiting bodies could be observed in the canker area. A portion of the branch was incubated in water. Large numbers of the pinewood nematode, Bursaphelenchus xylophilus, were observed in the water after incubation. This marked a new host record for the pinewood nematode in West Virginia.

Miscellaneous

At the request of Robert Frame, the Pesticides Coordinator, an experiment was devised to assay for Banvel (Dicamba) in spring water for a property owner in Elkview. The bioassay was necessary because our Laboratory Division is presently unable to analyze for Banvel residue. The forest pathologist and agricultural crops pathologist designed and conducted the experiment. None of the control plants or those treated with spring water displayed symptoms. However, those treated with the known Banvel solution appeared twisted and stunted. They also developed large numbers of adventitious buds near the groundline. In addition, swellings and cracks developed on the stem.

The forest pathologist participated in the Tordon water sample survey twice during the fiscal year. Water samples were collected in free flowing streams and city water systems in Webster, Pocahontas, Nicholas and Greenbrier Counties. Tordon was detected in two samples collected from the Greenbrier River during the fall of 1984. No Tordon was detected on any streams sampled during the spring of 1985.

Herbicides misapplications to nontarget plants appears to be much more common in recent years. Frequently, these misapplications result from honest mistakes by the applicator. Unfortunately, herbicides are occasionally now being used to vandalize ornamental plantings and gardens. During the fiscal year, the forest pathologist investigated two cases of herbicide vandalism. In each case, Tordon was applied around desirable plants with considerable damage resulting to those plants. The culprit was not found.

Numerous hours of program time were spent working on the landscape planting around the administration building. The landscape planting was mulched, watered and weeded. Replacement plants were procured and planted. Drought conditions during the summer of 1984 were very hard on the planting. Fortunately, we experienced adequate rainfall during the spring and early summer of 1985. The planting appears to be growing very well now.

As staff assistant to the Division director, the forest pathologist is frequently required to assist in many diverse Division projects. On a number of occasions the forest pathologist assisted with the general maintenance of the greenhouse. These activities were conducted during weekdays as well as on weekends. General maintenance included venting the greenhouse and watering the plants. The forest pathologist also

assisted with the maintenance of the orchard. In the spring a number of hours were spent pruning the forest tree orchard. On certain occasions the forest pathologist assisted the nursery inspector with his inspections.

Several years ago, I was appointed to the graduate research committee for Gil Meyers, a student in Plant Pathology at WVU. Gil finally completed all of his thesis work in April. On April 19, 1985, I traveled to Morgantown to attend Gil's final seminar and help administer his final oral exam. Gil passed with flying colors. His thesis on pine root decline caused by the fungus Verticicladiello procera was well written.

One of the major accomplishments this fiscal year was the planning and hosting of the Northeast Forest Pathology Workshop. Sixty scientists from throughout the northeast and adjacent areas met at the Pocahontas County 4H Camp near Bartow to discuss forest tree diseases occurring in the northeast. Pre-meeting planning necessitated several trips to the Pocahontas County area. Mower Lumber Company, the local USFS Ranger district and private individuals cooperated with us. The only problems we experienced were weather related. All the scientists were highly complimentary of the meeting arrangements.

In June the forest pathologist attended the Southwide Forest Disease Workshop at Wrightsville Beech, North Carolina. The symposium on the forest decline situation in the United States and Europe proved extremely interesting. The forest pathologist entered the photography contest at the workshop and collected a third place award for a color slide of Nectria galligena perithecia fruiting on beech bark. The photograph was taken with the stereo microscope purchased for the laboratory just two years ago.

Pest Identification Lab

The forest pathologist assisted with the Pest Identification Lab by identifying and recommending control measures for the various insect, disease and weed specimens that were submitted to the lab and fell into his area of expertise. In addition, the forest pathologist answered numerous pest related phone calls and written requests for information. A total of 490 phone calls, 117 PIL's and 37 written requests were answered during the fiscal year.

Information and Education

During the year the forest pathologist prepared and recorded five radio tapes and two television interviews. In addition, lectures on forest pathology were given to civic groups, students in forestry at Glenville State College and students at the Forest Industries Camp, as well as the National Youth Science Camp. Due to interest in forestry by 4H groups, the forest pathologist assisted with the State and National 4H Forestry Competition. In addition, he led cub scouts at day camp on nature tours. Forest protection exhibits were maintained at the Forest Festival and the Pocahontas County Forestry Fair. A newsletter was compiled each quarter and the Annual Forest Insect and Disease Calendar and Pocket Secretary was prepared and distributed.

White Pine Blister Rust

This year 53,920 acres of land were surveyed for Ribes bushes (the alternate host for white pine blister rust disease) and for diseased pine. Suppression activities took place on 3,207 acres with 15,673 Ribes plants destroyed.

A total area of 414,906 acres occurs within the control zone one state and private land. White pine occurs in 224,934 acres of control zone land. The National Forest Control Zone encompasses 144,503 acres with white pine on 86,902 acres.

AMERICAN CHESTNUT PROJECT

The objective of this project is to find surviving American chestnut trees demonstrating resistance to the chestnut blight fungus, Endothia parasitica, evaluate them for possible breeding qualities, propagate them by grafting and establish seed bearing orchards. Specifically; Establish a genetic orchard at Lakine, West Virginia, in which the best accessions will be maintained for breeding stock.

The fall of 1984 was noteworthy in that some seedlings in the genetic orchard began to bear fruit and over 600 nuts were gathered. We send some of these to F. Villeneuve, Marsillargues, France, for use in a chestnut breeding program and some to Steve Erickson of Langley, Washington. We also shipped seedlings of Allegheny chinquapin to Erickson.

We are now having less difficulty in grafting on seedlings, and are studying the possibility of using native seedlings as well as the development of a more compatible Chinese rootstock.

This spring, Dr. William L. MacDonald of West Virginia University established a planting of about 1,600 American chestnuts. This was on private property. We contributed over 500 seedlings and the remainder came from Michigan. Diseased trees will be inoculated with hypervirulent strains of Endothia.

We made an especial effort to enlarge the genetic orchard at Lakin. Nearly 300 trees were planted. This brings up to approximately 1,000 the number of live seedling trees. We have room for an additional 200.

NOXIOUS WEED PROGRAM

The West Virginia Noxious Weed Act of 1976 (Chapter 19, Article 12-D of the Code of West Virginia, as amended) provides for the surveillance, suppression and control of certain plants determined to be detrimental to the public health or the economy of the State. Nine plant species have currently been declared to be noxious weeds. They are multiflora rose, johnsongrass, plumeless thistle, must thistle, curled thistle, marijuana, opium poppy, kudzu and autumn olive. The Noxious Weed Program has no permanent staff and activities under the program are conducted by existing staff at the expense of other programs.